



MATERIAL SAFETY DATA SHEET

Distributed By:
UCSC
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EMERGENCY PHONE #'S
CHEMTREC 800-424-9300
UCSC 602-269-9711

POLYMERIC DIPHENYLMETHANE DIISOCYANATE (MDI)

SECTION 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Rubinate® M
Product Use: Component of a polyurethane
Company:

Huntsman Polyurethanes (a business unit of Huntsman ICI Chemicals LLC)
286 Mantua Grove Rd.
West Deptford, NJ 08066-1723

For Polyurethanes product information/assistance:
West Deptford: (800) 257-5547 **Auburn Hills: (800) 553-8624**
Canadian Office: (905) 678-9150

SECTION 2 – COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENT(S)	% (w/w)	ACGIH TLV	CAS NO.
Polymeric Diphenylmethane Diisocyanate (polymeric MDI)	100	Not Listed	9016-87-9
CONTAINS:			
4,4'-Diphenylmethane-Diisocyanate (4,4' MDI) (approx. 45%)		0.005 ppm	101-68-8
MDI isomers/oligomers		Not Listed	9016-87-9

This material is classified as hazardous under OSHA Hazard Communication Standard (29 CFR 1910.1200).

SECTION 3 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Health Hazards: Irritating to eyes, respiratory system and skin. Inhalation at levels above the occupational exposure limit could cause respiratory sensitization and risk of serious damage to respiratory system. The onset of the respiratory symptoms may be delayed for several hours after exposure. A hyper-reactive response to even minimal concentrations of MDI may develop in sensitized persons. Sensitized persons should not be exposed to any mixture containing unreacted MDI.

Physical Hazards: Reacts slowly with water to produce carbon dioxide which may rupture closed containers. This reaction accelerates at higher temperatures.

Appearance: Dark brown liquid.

Odor: Slightly musty.

Read the entire MSDS for a more thorough assessment of the hazard information on this product.

SECTION 4 - FIRST AID MEASURES

General: In case of accident or if you feel unwell, seek medical advice IMMEDIATELY (show the label where possible).

Inhalation: Remove patient from exposure, keep warm and at rest. Obtain medical attention. Treatment is symptomatic for primary irritation or difficulty in breathing. If breathing is labored, oxygen should be administered by qualified personnel. Apply artificial respiration if breathing has ceased or shows signs of failing.

Eye Contact: Immediately flush eyes with running water for a minimum of 15 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Obtain medical attention IMMEDIATELY.

Skin Contact: Remove contaminated clothing. Immediately wash affected areas thoroughly with soap and water. Some organic materials such as corn oil or propylene glycol are effective in decontaminating MDI from the skin when applied immediately. If irritation, redness, or a burning sensation develops and persists, obtain medical advice. Contaminated clothing should be thoroughly cleaned before reuse.

Ingestion: Do NOT induce vomiting. Provided the patient is conscious, wash out mouth with water then give 1 or 2 glasses of water to drink. (Do not give anything by mouth to an unconscious person.) Consult physician.

Note to Physician: Symptomatic and supportive therapy may be needed. Following severe exposure medical follow-up should be monitored for at least 48 hours.

SECTION 5 - FIRE-FIGHTING MEASURES

Fire and Explosion Hazards: Containers may burst under intense heat. Due to reaction with water, a hazardous build-up of pressure could result if contaminated containers are resealed.

Extinguishing Media: Water, dry chemical, carbon dioxide, or appropriate foam. If water is used, very large quantities are required. Reaction between water and hot isocyanate may be vigorous. Contain run-off water with temporary barriers.

Fire-Fighting Procedures: As appropriate for surrounding materials/equipment.

Fire-Fighting Protective Equipment: Use self-contained breathing apparatus and full protective clothing (Bunker gear).

Flash Point: 425° F (218° C)

Flammable Limits (Lower): Not available

Flammable Limits (Upper): Not available

Autoignition: 240° F (464° C) (4,4'-Diphenylmethane Diisocyanate)

Decomposition Temperature: Not available

Burning Rate: Not available

Explosive Power: None

Sensitivity to Mechanical Impact: None

Sensitivity to Static Discharge: None

Combustion Productions: Carbon monoxide, carbon dioxide, nitrogen oxides and some HCN

SECTION 6 - ACCIDENTAL RELEASE MEASURES

For major spills call Chemtrec (800-424-9300)

Spills, Leaks or Releases: Clean-up should only be performed by trained personnel. People dealing with major spillages should wear full protective clothing including appropriate respiratory protection. Evacuate the area. Prevent further leakage, spillage or entry into drains. Contain and absorb large spillages onto an inert, non-flammable absorbent carrier (such as earth or sand). Shovel into open-top drums or plastic bags for further decontamination, if necessary. Wash the spillage area clean with liquid decontaminant. Test atmosphere for MDI. Neutralize small spillages with decontaminant. Remove and properly dispose of residues. (See Section 13 for disposal considerations.) Notify applicable government authorities if release is reportable. The CERCLA RQ for MDI is 5,000 lbs (see CERCLA in Section 15).

Preparation of Decontamination Solution: Prepare a decontamination solution of 0.2-0.5% liquid detergent and 3-8% concentrated ammonium hydroxide in water (5-10% sodium carbonate may be substituted for the ammonium hydroxide). Follow the precautions on the supplier's material safety data sheets when preparing and using solution.

Use of Decontamination Solution: Allow deactivated material to stand for at least 30 minutes before shoveling into drums. Do not tighten the bungs. Mixing with wet earth is also effective, but slower.

SECTION 7 - HANDLING AND STORAGE

Handling: Avoid personal contact with the product or reaction mixture. Use only with adequate ventilation to ensure that the occupational exposure limit is not exceeded. The efficiency of the ventilation system must be monitored regularly because of the possibility of blockage. Avoid breathing aerosols, mists and vapors. (See Section 8 – Exposure Control for details.)

Storage Requirements: Keep containers properly sealed and when stored indoors, in a well ventilated area. Keep contents away from moisture. Due to reaction with water, producing CO₂ gas, a hazardous build-up of pressure could result if contaminated containers are resealed. Do not reseal contaminated containers. Uncontaminated containers, free of moisture, may be resealed only after placing under a nitrogen blanket. Do not store in containers made of copper, copper alloys, or galvanized surfaces.

Storage Temperature: Ideal storage temperature is 16-38° C (60-100° F)

Keep stocks of decontaminant (see Section 6) readily available).

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

PREVENTIVE MEASURES:

Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

Engineering Controls: Use local exhaust ventilation to maintain airborne concentrations below the TLV. Suitable respiratory equipment should be used in cases of insufficient ventilation or where operational procedures demand it. For guidance on engineering control measures refer to publications such as the ACGIH current edition of "Industrial Ventilation, a manual of Recommended Practice".

Personal Protective Equipment:

Eye Protection: Chemical safety goggles. If there is a potential for splashing, use a full face shield.

Skin Protection: The following protective materials are recommended:

Gloves – neoprene, nitrile rubber, butyl rubber. Thin latex disposable gloves should be avoided for repeated or long term use. Protective clothing should be selected and used in accordance with “Guidelines for the Selection of Chemical Protective Clothing” published by ACGIH.

Respiratory Protection: When the product is sprayed or heated without adequate ventilation, an approved MSHA/NIOSH positive-pressure, supplied-air respirator may be required. Air purifying respirators equipped with organic vapor cartridges and a HEPA (P100) particulate filter may be used under certain conditions when a cartridge change-out schedule has been developed in accordance with the OSHA respiratory protection standard (29 CFR 1910.134).

EXPOSURE GUIDELINES:

Medical supervision of all employees who handle or come in contact with respiratory sensitizers is recommended. Persons with respiratory problems including asthmatic-type conditions, chronic bronchitis, other chronic respiratory diseases or recurrent skin, eczema or skin allergies should be evaluated for their suitability of working with this product. Once a person is diagnosed as sensitized, no further exposure to the material that caused the sensitization should be permitted.

HAZARDOUS INGREDIENTS(S):

4,4'-Diphenylmethane Diisocyanate:

ACGIH TLV	0.05 mg/M3 (8-hour, 40 hours/week)
OSHA PEL Ceiling	0.20 mg/M3
NIOSH REL/TWA	0.05 mg/M3 (10-hour, 40 hours/weeks)
NIOSH REL/Ceiling	0.20 mg/M3 (10-minute)

NOTE: The Occupational Exposure Limits listed for isocyanates do not apply to previously sensitized individuals.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Alternate Name(s): Polymeric MDI

Chemical Name: Not applicable (mixture)

Chemical Family: Diisocyanate

Appearance: Dark brown liquid

Odor: Slightly musty

Odor Threshold: 4.0 mg/M3 (4,4'-Diphenylmethane Diisocyanate)

pH: N/A

Flash Point: 425° F (218° C)

Vapor Pressure: (mm Hg at 20° C): approx. 4×10^{-6}

Vapor Density (air=1): 8.5 approx.

Boiling Point: 406° F (208° C) at 5 mmHg

Melting Point: Not available
Solubility (water): Reacts with water
Solubility (other): Soluble in most organic solvents
Specific Gravity: 1.24 approx. at 25° C
Evaporation Rate: N/A

SECTION 10 - STABILITY AND REACTIVITY

Hazardous Decomposition Products: Highly unlikely under normal industrial use. See Section 5.

Chemical Stability: Stable at room temperature.

Conditions to Avoid: Avoid high temperatures. Avoid freezing.

Incompatibility with Other Substances: This product will react with any materials containing active hydrogens such as water, alcohol, amines, bases and acids. The reaction with water is very slow under 50° C (122° F) but is accelerated at higher temperatures.

Hazardous Polymerization: Polymerization may occur at elevated temperatures in the presence of alkalis, tertiary amines, and metal compounds.

SECTION 11 - TOXICOLOGICAL INFORMATION

Polymeric MDI:

Oral LD50 (rat) > 5,000 mg/kg
Dermal LD50 (rabbit) > 5,000 mg/kg

POTENTIAL HEALTH EFFECTS:

Inhalation: This product is a respiratory irritant and potential respiratory sensitizer. Inhalation of vapor or aerosol at levels above the occupational exposure limit could cause respiratory sensitization and lung injury. Symptoms may include irritation to the eyes, nose, throat and lungs, possibly combined with dryness of the throat, tightness of chest and difficulty in breathing and/or flu-like symptoms. The onset of the respiratory symptoms may be delayed for several hours after exposure. A hyper-reactive response to even minimal concentrations of MDI may develop in sensitized persons. In a single evaluation of 5 men occupationally exposed to MDI and hydrocarbon solvent vapors under conditions where adequate ventilation or other safety precautions were not used, neuropsychologic findings were attributed to MDI.

Eye Contact: The aerosol, vapor or liquid will irritate human eyes following contact.

Skin Contact: Moderate irritant. Repeated and/or prolonged contact may cause skin sensitization. There is limited evidence from animal studies that skin contact may play a role

in respiratory sensitization. These results emphasize the need for protective clothing including gloves to be worn at all times when handling these chemicals or in maintenance work.

Ingestion: Ingestion may cause irritation of the gastrointestinal tract. Based on the acute oral LD50, this product is considered practically non-toxic by ingestion.

Chronic Effects: A study was conducted where groups of rats were exposed for 6 hrs/day, 5 days/week for a lifetime to atmospheres of respirable polymeric MDI aerosol at concentrations of 0, 0.2, 1 or 6 mg/M3. No adverse effects were observed at 0.2 mg/M3. At the 1 mg/M3 concentration, minimal nasal and lung irritant effects were seen. Only at the top concentration (6.0 mg/M3) was there an increased incidence of a benign tumor of the lung (adenoma). One malignant pulmonary tumor (adenocarcinoma) was seen in the 6.0 mg/M3 group. MDI administration to rats in this study did not change the distribution and incidence of tumors from those seen in control animals. The increased incidence of lung tumors is associated with prolonged respiratory irritation and the concurrent accumulation of yellow material in the lung. In the absence of prolonged exposure to

high concentrations leading to chronic irritation and lung damage, it is highly unlikely that tumor formation will occur.

Carcinogenicity: The ingredients of this product are not classified as carcinogenic by ACGIH or IARC, not regulated as carcinogens by OSHA, and not listed as carcinogens by NTP.

Mutagenicity: There is no substantial evidence of mutagenic potential.

Reproductive Effects: No adverse reproductive effects are anticipated.

Teratogenicity and Fetotoxicity: No birth defects were seen in two independent animal (rat) studies. Fetotoxicity was observed at doses that were extremely toxic (including lethal) to the mother. Fetotoxicity was not observed at doses that were not maternally toxic. The doses used in these studies were maximal, respirable concentrations well in excess of the defined occupational limits.

SECTION 12 - ECOLOGICAL INFORMATION

Environmental Fate and Distribution: It is unlikely that significant environmental exposure in the air or water will arise, based on consideration of the production and use of the substance.

Persistence and Degradation: Immiscible with water, but will react with water to produce inert and non-biodegradable solids.

Toxicity: Polymeric MDI

LC50 (Zebra Fish) > 1000 mg/l (at the highest level tested of 1000 mg/l there were no deaths)

EC50 (Daphnia magna) (24 hour) > 1000 mg/l

EC50 (E. Coli) > 100 mg/l

SECTION 13 - DISPOSAL CONSIDERATIONS

The generation of waste should be avoided or minimized wherever possible.

Disposal should be in accordance with local, state, provincial or national regulations. This material is not a hazardous waste under RCRA 40 CFR 261. Small quantities should be treated with a decontaminant solution (See Section 6). The treated waste is not a hazardous material under RCRA 40 CFR 261. Chemical waste, even small quantities, should never be poured down drains, sewers or waterways.

Empty containers should be decontaminated and either passed to an approved drum recycler or destroyed.

SECTION 14- TRANSPORT INFORMATION

DOT: Single containers less than 5,000 lbs. Are not regulated. Single containers with 5,000 lbs. Or more of 4,4'-MDI are regulated as: Other Regulated Substances, Liquid, N.O.S. (Methylene Diphenyl Diisocyanate), 9, NA3082, PGIII, RQ.

Transportation Emergency Telephone Number 10800-424-9300 (Chemtrec)

TDG: Not Regulated

IMO: Not Regulated

IATA/ICAO Class: Not Regulated

SECTION 15 - REGULATORY INFORMATION**USA CLASSIFICATION:**

OSHA Classification: This product is classified as a hazardous material under the criteria outlined in the OSHA Hazard Communication Standard (HCS) (29 CFR 1910.1200).

TSCA (Toxic Substances Control Act) Regulations: All ingredients are on the TSCA Chemical Substance Inventory.

EPCRA Section 313 (40 CFR 372): This product contains the following chemical(s) subject to reporting requirements: 100% Diisocyanate compounds (Category Code N120).

CERCLA (Comprehensive Environmental Response, Compensation and Liability Act): 4,4'-Methylene diphenyl diisocyanate (CAS 101-68-8) has a 5,000 lb. RQ (reportable quantity). Any spill or release above the RQ must be reported to the National Response Center (800-424-8802). The % of 4,4'-MDI in this product is listed in Section 2 of this MSDS.

This product does not contain nor is it manufactured with ozone depleting substances.

Other Regulations/Legislation which apply to this product: Massachusetts Right-to-Know, Pennsylvania Right-to-Know, New Jersey Right-to-Know, CERCLA.

CANADIAN CLASSIFICATION:

This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS contains all the information by the CPR.

CEPA/Canadian Domestic Substances List (DSL): The substance(s) in this product is/are on the Canadian Domestic Substances List (CEPA DSL).

SECTION 16 – OTHER INFORMATION

Glossary: ACGIH	American Conference of Governmental Industrial Hygienists
IARC	International Agency for Research on Cancer
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration

For Your Protection: Huntsman Polyurethanes warrants only that its products meet the specifications stated in the sales contract. Typical properties, where stated, are to be considered as representative of current production and should not be treated as specifications. While all the information presented in this document is believed to be reliable and to represent the best available data on these products, **NO GUARANTY, WARRANTY, OR REPRESENTATION IS MADE, INTENDED, OR IMPLIED AS TO THE CORRECTNESS, OR SUFFICIENCY OF ANY INFORMATION, OR AS TO THE MERCHANTABILITY OR SUITABILITY OR FITNESS OF ANY CHEMICAL COMPOUNDS OR OTHER PRODUCTS FOR ANY PARTICULAR USE OR PURPOSE, OR THAT ANY CHEMICAL COMPOUNDS OR OTHER PRODUCTS OR THE USE THEREOF ARE NOT SUBJECT TO A CLAIM BY A THIRD PARTY FOR INFRINGEMENT OF ANY PATENT OR OTHER INTELLECTUAL PROPERTY RIGHT. THE USER SHOULD CONDUCT SUFFICIENT INVESTIGATION TO ESTABLISH THE SUITABILITY OF ANY PRODUCT FOR ITS INTENDED**

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Prepared By: Polyurethanes Applied Toxicology/Regulatory Services (856) 423-8484